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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
REGULAR APPLICATION FOR UTILITY PATENT

5 Title: **STAND-OFF FOR SUPPORTING ART AND OTHER OBJECTS**

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RELATED APPLICATIONS

None

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## FIELD OF THE INVENTION

The present invention relates generally to mechanisms used for supporting art and other objects, and more particularly, a stand-off system to hang art and other objects, which have regular and/or irregular shapes, vertically against a wall and/or backdrop.

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## BACKGROUND OF THE INVENTION

There are many known methods and apparatus used to hang art or other objects on wall or any kind of backdrop. A common method is attachment of a wire or cord to the back of a piece of art with screw eyes or similar fasteners. The wire or cord is then placed over a nail, single picture hook or similar fastener attached to a wall.

More particularly to painting or other two dimension art pieces, there is the flexible wire or cord hanging system. Art pieces are secured inside a picture frame. A wire or cord is then fastened on each of the vertical sides of the frame with screw eyes or similar fasteners. The wire or cord is then placed over a single picture hook or similar fastener attached to a wall.

This method places tremendous tension on both the wire and the wire anchor points on the frame. The tension will often break the wire, pull out fasteners, split the frame, and/or bow the sides and top of the frame. Any of the preceding can result in damage to the art within the frame and to the frame itself. For example, if the wire is fastened to the anchor-points so that it is near horizontal across the back of the frame, the forces on the wire and each anchor-point can be as much as 14 times the weight of the frame.

There are also other methods for similar usages in the market such as blue-tip. The clay-textured product can be applied on the back of art or any object. The adhesive nature of the product will then act as a glue to attach art pieces or any object to the surface of a wall or any surface. On the same mechanism, some simply apply glues on the back of art pieces or any object and stick it on the wall.

Moreover, there are mechanical elements such as different kinds of hooks, knobs and fasteners available in the market for the same purpose. These are more often used for art pieces that are not suitable for framing or relatively heavy objects. These mechanisms usually require certain degree of

permanent damage to the hanging piece. Besides, those mechanisms are very relatively complex and not flexible to dislodge once they are in place.

## ADVANTAGES AND SUMMARY OF THE INVENTION

An object and advantage of the present invention is a mechanism to securely support art or other objects on a relatively vertical rigid wall or backdrop of essentially any kind. In our mechanism, this involves a novel stand-off system. The stand-off system comprises a matching pair of stem portion and bracket components. Key to the present invention is the stem portion and bracket interlock to one another and how they are secured to the hanging piece and wall, respectively.

Another object and advantage of the present invention to provide a stem portion and bracket which interlock by their particular matching shapes. It is unnecessary to apply any mechanical fasteners like screws or glues to enhance the engagement. Therefore, it is a simple matter to move the whole system by simply lifting and removing the hanging piece. Additionally, the stand-off system works on almost any object. It does not require a frame like the flexible wire or cord hanging system as shown in FIG.1A. It also works on hanging objects with irregular shape and/or contour back surface, which present larger and different problems using other hanging methods.

Another object and advantage of the present invention is to provide such system which will serve to support heavy weight. Since the stem portion and bracket of the stand-off system is locked together vertically, the weight of the hanging piece itself will help secure the locking position.

The present invention is a stand-off system for providing fixed, vertical orientation of artwork parallel to a vertical surface, thereto provide a completely vertical suspension without any distortion,

deformation, or rotated hanging art work. The system comprises a bracket having a portion for coupling the bracket to the vertical surface and a vertical mounting plate portion, the mounting plate having a shaped opening positioned along an upper edge surface of the mounting plate portion, and a stem portion having a mounting surface for rigidly mounting the stem portion onto the artwork, the stem portion further comprising a body portion and flat head portion separated by a shaped neck portion, the head and neck portions defining a flange shaped to precisely register with the shaped opening and thereby maintain a predetermined orientation of the piece of artwork. Consequently, the stand-off systems of the present invention can be applied at strategic positions on the back of artwork to attain a desirable presentation orientation. As an example, while a picture may be hung essentially level, individual glass fish or other animals, trees or objects can be presented or installed at any angle, orientation or inter-related relationship.

Another advantage of the present invention is its wide usage both in an indoor or outdoor settings or installations.

Further objects and advantages of the present invention will be come apparent through the following descriptions, and will be included and incorporated herein.

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## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a representative schematic sectional view showing a common mechanism **90** of hanging an art piece (prior art).

5           FIG. 1B is a representative cross-sectional view of a preferred embodiment of a stem portion **120** of the stand-off system **100** of the present invention.

FIG. 1C is a representative cross-sectional view of a preferred embodiment of a bracket **140** of the stand-off system **100** of the present invention.

10           FIG. 2A is a representative side view of a preferred embodiment of bracket **140** of the stand-off system **100** of the present invention.

FIG. 2B is a representative side view of a preferred embodiment of stem portion **120** of the stand-off system **100** of the present invention.

15           FIG. 2C a representative cross-sectional view of a preferred embodiment of the stand-off system **100** of the present invention in an actual application situation.

20           FIG. 3A is a representative side view of a preferred embodiment of an alternative bracket design **300** of the stand-off system **100** of the present invention.

FIG. 3B is a representative side view of a preferred embodiment of another alternative bracket design **310** of the stand-off system **100** of the present invention.

FIG. 3C is a representative side view of a preferred embodiment of another alternative bracket design 320 of the stand-off system 100 of the present invention.

FIG. 3D is a representative side view of a preferred embodiment of an alternative stem portion design 330 of the stand-off system 100 of the present invention.

FIG. 3E is a representative side view of a preferred embodiment of another alternative stem portion design 340 of the stand-off system 100 of the present invention.

FIG. 4A shows a representative view of a preferred method of use of the stand-off system 100 of the present invention.

FIG. 4B shows a representative front view of a preferred embodiment of stand-off 100 supporting and securing an art piece 404.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The description that follows is presented to enable one skilled in the art to make and use the present invention, and is provided in the context of a particular application and its requirements. Various modifications to the disclosed embodiments will be apparent to those skilled in the art, and the general principals discussed below may be applied to other embodiments and applications without departing from the scope and spirit of the invention. Therefore, the invention is not intended to be limited to the embodiments disclosed, but the invention is to be given the largest possible scope which is consistent with the principals and features described herein.

It will be understood that in the event parts of different embodiments have similar functions or uses, they may have been given similar or identical reference numerals and descriptions. It will be understood that such duplication of reference numerals is intended solely for efficiency and ease of understanding the present invention, and are not to be construed as limiting in any way, or as implying that the various embodiments themselves are identical.

FIG. 1A is a representative schematic sectional view showing a common mechanism 90 of hanging an art piece 92 (prior art). The flexible wire or cord hanging system 90 used to hang art requires the attachment of a wire or cord 94 to each of the vertical sides of art piece 92 with screw eyes 93 or similar fasteners. The wire or cord 94 is then placed over one or more picture hooks 96 or similar fastener attached to wall 102.

FIG. 1B is a representative cross-sectional view of a preferred embodiment of a stem portion 120 of the stand-off system 100 of the present invention. In a preferred embodiment, stem portion 120 is formed of a single material of construction with no assembly of parts, thereby increasing strength and resistance. In a preferred embodiment, stem portion 120 is made of machined stainless steel. Other

preferred materials include wood, plastic, resin and synthetic materials. Other methods of construction of the stem portion 120 include extrusion, welding, screwed, riveted or bolted assembly, etc.

As shown in FIG. 1B, stem portion 120 comprises of head 122, neck 124, body 126 and base 128. The main function of head 122 is for securing to bracket 140 in applications. In a preferred embodiment, the circumference of head 122 is greater than that of neck 124 to secure the locked position.

Neck 124 connects head 122 and body 126. In a preferred embodiment, the girth of neck 124 is smaller than those of head 122 and body 126. In this arrangement, there is a slot 125 created between head 122 and body 126 at the neck 124 area. Neck 124 and slot 125 latch onto bracket 140 with the body in a specific orientation. The girth or diameter of neck 124 as well as the width of the flange defining the head portion 122 are key in determining the strength or weight resistance of the whole system.

A function of body 126 is to provide a comfortable buffering space between hanging art piece 92 and bracket 140. The thickness of body 126 could be adjusted during the manufacturing process, and determines the overall strength of stem portion 120. The length of body 126 could also be adjusted during the manufacturing process. It should be set to provide a comfortable buffering space between the back of hanging art piece 92 and bracket 140, and yet not too long thereof generating an unnecessarily big downward moment **D** about the mounting point on the wall 102, resulting in failure to the system. In a preferred embodiment, the cross-section of body 126 could be circular, squarish, hexagonal, etc. to meet aesthetic and mechanical needs.

The main function of base 128 is to provide a contact surface to adhere to the back of art piece 92. In a preferred embodiment, industrial strength adhesive 130 such as resin epoxy is applied for

operative, and effective adhesion to art piece **92** such as epoxy. The recommended commercial epoxy includes Loc-Tite 7075 activator (Part No.: 22671) and 324 adhesive (Part No.: 32430). Other commercial epoxies with similar strength could also be applied, but it is critical to provide a highly effective, fail-safe adhesive system such as will be known to those skilled in the art. In a preferred embodiment, base **128** could either be flat or customized to better adhere to a contoured surface of the back of an art piece **402**.

FIG. 1C is a representative cross-sectional view of a preferred embodiment of a bracket **140** of the stand-off system **100** of the present invention. As described with respect to the head portion **122**, bracket **140** is formed from a single piece of material. In a preferred embodiment, bracket **140** is made of stainless steel in a sheet metal bending process. Other preferred materials include wood, plastic, resin and other synthetic materials. Other methods of construction of the bracket portion **140** include extrusion, welding, screwed, riveted or bolted assembly, etc. The thickness, building material and manufacturing process will determine the overall strength of bracket **140**.

As shown in FIG. 1C, the J-shaped bracket **140** comprises of front panel **146**, platform **144** and back panel **142**.

Front panel **146** is a flat vertical strip further comprising interlocking opening **202**. The main function of front panel **146** is to provide a cradle for neck **124** of stem portion **120** in the interlocking position of the whole stand-off system of present invention **100**. In a preferred embodiment, the thickness of front panel **146** should be slightly smaller than that of neck **124** for a tight but comfortable fit.

Platform **144** is a flat horizontal strip joining front panel **146** and back panel **142**. The space

created between front panel 146 and back panel 142 provides a space to house the head 122 of stem portion 120 in the real application of stand-off system of present invention 100. The length of platform 144 should be larger than that of head 122 but not too long to generate an unnecessarily large downward moment D1 to cause failure at the junction part 150 between platform 144 and back panel 142, and/or other areas.

In a preferred embodiment, back panel 142 is a flat vertical strip with hole 148 one or two mounting holes 148 positioned in the horizontal center or side by side horizontally, or elsewhere on the bracket portion. A screw or nail 150 goes through hole 148 of back panel 142 and into wall 102 to secure bracket 140 and subsequently the whole stand-off system 100 to wall 102.

FIG. 2A is a representative side view of a preferred embodiment of bracket 140 of the stand-off system 100 of the present invention. As shown Best in FIG. 1A and 2A, the J-shaped bracket 140 comprises of front panel 146, platform 144 and back panel 142.

Front panel or mounting plate portion 146 is a flat vertical strip portion of material, essentially parallel to the wall surface 102, further comprising shaped or interlocking opening 202. As shown in FIG. 2A, in one of the preferred embodiments, the base of interlocking opening 202 is squarish comprising two right angled corners. Side edges 204 then go up and curve outward to create a concave shaped opening 202. The main function of concave shaped interlocking opening 202 is to provide a cradle for neck 124 of stem portion 120 in the interlocking position of the whole stand-off system of present invention 100. The size of interlocking opening 202 should be slightly bigger than that of neck 124 of stem portion 120 for a comfortably tight fit.

In a preferred embodiment, back panel **142** is a flat vertical strip with one or two holes **148** positioned in the horizontal center in an one-hole embodiment or side by side horizontally. The two-hole arrangement particularly avoids turning of the whole system **100** while supporting an object with an uneven distribution of weight, and will prevent rotation or swinging of the entire unbalanced system:

FIG. 2B is a representative side view of a preferred embodiment of stem portion **120** of the stand-off system **100** of the present invention. As shown best in FIG. 1B and 2B, stem portion **120** comprises of head **122**, neck **124**, body **126** and base **128**.

As shown in FIG. 2B, neck **124** has a squarish cross section comprising a right angle at all four corners and it connects head **122** and body **126**. In a preferred embodiment, the girth of neck **124** should be smaller than those of head **122** and body **126**. Owing to this arrangement, there is a slot **125** created between head **122** and body **126** at the neck **124** area. The girth of neck **124** should also be slightly smaller than the width of interlocking opening **202** of bracket **140** to ensure a comfortably tight clearance between the two elements.

The main function of neck **124** and slot **125** is to provide a niche to latch onto bracket **140** at the interlocking opening **202** of bracket **140** in the actual application of present invention **100**. The girth of neck **124** is one of the key determining factors for the weight resistance of the whole system of present invention **100**.

FIG. 2C a representative cross-sectional view of a preferred embodiment of the stand-off system **100** of the present invention in an actual application situation. The system **100** could be used both in an indoor or outdoor surroundings. As shown, stem portion **120** and bracket **140** engage in an anchoring

position and interlock to each other at neck 124 of stem portion 120 and interlocking opening 202 of bracket 140. Neck 124 of stem portion 120 and interlocking opening 202 of bracket 140 have the same square shape and the girth of neck 124 is machined slightly smaller than the width of interlocking opening 202 to ensure a comfortably narrow clearance between the two elements. Also, this arrangement avoids neck 124 from twisting off from interlocking opening 202 due to horizontal stress H.

The convex shaped side edges 204 on front panel 146 of bracket 140 facilitate the entrance of neck 124 of stem portion 120 to interlocking opening 202 of bracket 140. It is particularly useful when there are a plurality of stand-off systems 100 being used on the same art piece 92. During installation of the piece, side edges 204 of bracket 140 slide right into the slot 125 of stem portion 120, attaining the locked position of stand-off system 100.

The girth of head 122 of stem portion 120 is bigger than those on neck 124 and interlocking opening 202 of bracket 140. The weight of art piece 92 and stem portion 120 generates a vertical moment V that will pull stem portion 120 away from the interlocking position. The base of head 122 is pulled towards front panel 146. Due to its bigger size, head 122 prevents dislodging of stem portion 120 from bracket 140.

In a preferred embodiment, industrial strength adhesive 130 such as resin is applied for effective adhesion to art piece 92. Base 128 could either be flat or customized to better adhere to a contour surface of the back of art piece 402. The adhesion between art piece 92 and base 128 of stem portion 120 avoids art piece 92 from sliding off.

In a preferred embodiment, back panel 142 of bracket 140 is a flat vertical strip with hole 148

positioned in the horizontal center. In a preferred method, a screw or nail 150 goes through hole 148 of back panel 142 and into wall 102 to secure bracket 140, subsequently the whole stand-off system 100 and art piece 92 to wall 102.

5 Stand-off system 100 of present invention could be used individually or in groups. The quantity and their respective position on the back of art piece 92 depends on weight, size and shape of the art piece 92. Besides, the strength of adhesive 130 as well as the materials of construction could also affect the number of stand-off systems 100 of present invention required. For art pieces 92 that are made of glass and/or other translucent/transparent materials, stand-off systems 100 could be placed strategically  
10 to minimize visual disturbance of the appreciative view of the art piece 92.

FIG. 3A is a representative side view of a preferred embodiment of an alternative bracket design 300 of the stand-off system 100 of the present invention. As shown, the base of interlocking opening 302 of bracket 300 is circular, providing a semicircular opening. Side edges 204 remain straight and open  
15 convexly upward. In a preferred embodiment, bracket 300 is used with matching stem portion 330 or stem portion 340 with circular shaped neck 332.

FIG. 3B is a representative side view of a preferred embodiment of another alternative bracket design 310 of the stand-off system 100 of the present invention. Bracket 310 further comprises two side  
20 panels 314 connecting side edges 205 of front panel 146 to back panel 142. In a preferred embodiment, side panels 314 is made of the same material as bracket 310. The side panels 314 add additional strength to bracket 310.

FIG. 3C is a representative side view of a preferred embodiment of another alternative bracket

design 320 of the stand-off system 100 of the present invention. As shown, the base of interlocking opening 302 of bracket 310 is pointed. Side edges 322 are straight and open up from the base, creating an sharp angle. As a result, interlocking opening 324 is V-shaped. In a preferred embodiment, bracket 310 could be used with both stem portion 120 which has a squarish neck 124 and stem portion 330 and/or stem portion 340 which both have a circular neck 332.

FIG. 3D is a representative side view of a preferred embodiment of an alternative stem portion design 330 of the stand-off system 100 of the present invention. Stem portion 330, instead of having a square-shaped neck portion 124 of stem portion 120 as shown Best in FIG. 2B, has a circular-shaped neck 332. Stem portion 330 should be used with complimentary bracket 300 and/or bracket 310, both have a circular-shaped interlocking opening 302. The width of neck 332 of stem portion 330 should be slightly smaller than the opening 302 of bracket 300 and/or bracket 310 to ensure a comfortably tight locking position of the stand-off system of present invention 100.

FIG. 3E is a representative side view of a preferred embodiment of another alternative stem portion design 340 of the stand-off system 100 of the present invention. Body 342 of stem portion 340 has a relatively smaller diameter than that of body 128 of stem portion 120 and stem portion 330 as shown best in FIG. 2B and FIG. 3D respectively. The slimmer body 342 is suitable to support art pieces 92 of lighter weight. It also improve the aesthetic values of the side view of the overall decorative setting. Besides, for hanging art pieces 92 which are made of glass and/or other translucent/transparent materials, the slimmer body 342 would improve the frontal view significantly.

FIG. 4A shows a representative view of a preferred method of use of the stand-off system 100 of the present invention. As shown, the back of art piece 402 is not flat and is contoured instead. If a



plurality of stand-off systems 100 with different lengths are used to support art piece 402, a plurality, i.e., one or more, stand-off systems 100 of present invention with a variety of lengths are selected. Number and location of application spots 404 can be selected based on weight and shape of art piece 402.

5           FIG. 4B shows a representative front view of a preferred embodiment of stand-off system 100 supporting and securing an art piece 404. As shown, a single stand-off system 100 of present invention can support art piece 404 even with an irregular shape.

          The whole art piece is supported at application spot 404 where stand-off system 100 is applied.  
10       As shown best in FIG. 2C, neck 124 of stem portion 120 and interlocking opening 202 of bracket 140 have similar square shapes. Neck 124 is slightly smaller than the width of interlocking opening 202 to ensure a comfortably tight clearance between the two elements. Also, this arrangement avoids neck 124 from twisting off from interlocking opening 202 due to horizontal stress or bending moment.

15           In applications where multiple stand-off systems 100 of present invention are used, each stand-off system 100 will resist respective horizontal stress **H** with the same mechanism. As a result, art piece 92 is safely secured on wall 102.

#### EXPERIMENTAL RESULTS

20           In testing preformed with actual stem and bracket portions of the present invention, successful results were obtained. in a specific set of tests, the following data was collected. Table 1 is a table showing experimental strength data collected in successful testing procedures.

Experimental Strength Test Data				
Number of Stand-Offs	1	2	4	2 (Uneven distribution of weight support)
Size (neck diameter)	Weight - max. (pounds)			
Small (1/2")	10	20	40	15
Medium (5/8")	15	30	60	22.5
Large (3/4")	28	56	112	42
X-Large (1")	43	86	172	64.5

Table 1

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the present invention belongs.

Although any methods and materials similar or equivalent to those described can be used in the practice or testing of the present invention, preferred methods and materials are now described. All publications and patent documents referenced in the present invention are incorporated herein by reference.

While the principles of the invention have been made clear in illustrative embodiments, there will be immediately obvious to those skilled in the art many modifications of structure, arrangement, proportions, the elements, materials, and components used in the practice of the invention, and otherwise, which are particularly adapted to specific environments and operative requirements without departing from those principles. The appended claims are intended to cover and embrace any and all such modifications, with the limits only of the true purview, spirit and scope of the invention.

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